

Remarks

This Amendment is being filed concurrently with a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114. Accordingly, reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 43-81 are pending in the application, with 43, 55, and 69 being the independent claims. Claims 43, 55, and 69 are sought to be amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Rejections under 35 U.S.C. § 112

On page 2 of the Office Action, the Examiner rejected claims 43-81 under 35 U.S.C. § 112, second paragraph, for allegedly being indefinite. Applicants respectfully disagree that claims 43-81 are indefinite. However, in order to expedite allowance of the present application, Applicants have amended claims 43, 55, and 69 to further clarify that “the second input of the carry propagation adder is selectively coupled to the second result output of the first array and the third result output of the second array.” Accordingly, reconsideration and withdrawal of this rejection of claims 43-81 are respectfully requested.

Rejections under 35 U.S.C. § 101

On page 3 of the Office Action, the Examiner rejected claims 43-81 under 35 U.S.C. § 101 for allegedly being directed to non-statutory subject matter. Applicants respectfully traverse this rejection.

Claims 43-54 are directed to a processor. Claims 69-81 are directed to a system such as, for example, a system on a semiconductor chip that includes a processor and memory. These claims are directed to a novel and unique combination of elements that has substantial utility. The practical applications for the novel combination is described in, for example, the Summary beginning on page 2 of the present application. As such the claims are clearly directed to statutory subject matter. Applicants are unaware of any legal requirement to list in a claim all of the practical applications for a processor or a system having the improved multiplication capability as set forth in the present claims. If the Examiner decides to maintain this rejection in the next Office Action, Applicants respectfully request that the Examiner provide a legal basis for the rejection so that it can be addressed.

Claims 55-68 are directed to a tangible computer readable storage medium comprising a processor embodied in software. As is known to persons skilled in the electronic design arts, software descriptions of processors are automatically synthesizable and are used to produce semiconductor chips. In fact, practically all semiconductor chips having more than a few transistors are designed, optimized, and manufactured today using hardware description languages. Semiconductor devices are sold to system-on-a-chip manufacturers in the form of synthesizable software. Thus, a tangible computer readable storage medium comprising a processor embodied in

software has a significant practical application, namely to manufacture semiconductor chips. Furthermore, in 1995, the Commissioner of Patents and Trademarks conceded to the U.S. Court of Appeals for the Federal Circuit “that computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. § 101.” See In re Beauregard, 53 F.3d 1583 (Fed. Cir. 1995). Thus, any rejection of claims 55-68 under 35 U.S.C. § 101 is improper.

Reconsideration and withdrawal of this rejection of claims 43-81 are respectfully requested.

Rejections under 35 U.S.C. § 103

Beginning on page 3 of the Office Action, the Examiner rejected claims 43, 50-55, 62-66, 69, and 76-81 under 35 U.S.C. § 103 for allegedly being unpatentable over U.S. Patent 6,480,872 to Choquette (“Choquette”) in view of U.S. Patent 4,847,801 to Tong (“Tong”). Beginning on page 7 of the Office Action, the Examiner rejected claims 48-49, 60-61, and 74-75 under 35 U.S.C. § 103 for allegedly being unpatentable over Choquette in view of Tong and U.S. Patent 6,711,602 to Bhandal et al. (“Bhandel”). Beginning on page 8 of the Office Action, the Examiner rejected claims 67 and 68 under 35 U.S.C. § 103 for allegedly being unpatentable over Choquette in view of Tong and U.S. Patent 6,066,178 to Bair et al. (“Bair”). Applicants respectfully traverse these rejections.

Claim 43, as amended, recites:

43. A processor, comprising:
a first array that is used to perform arithmetic multiplication, the first array having a first result output and a second result output;
a second array that is used to perform binary polynomial multiplication, the second array having a third result output; and
a carry propagation adder having a first input and a second input,
wherein the first input of the carry propagation adder is coupled to the first result output of the first array, and the second input of the carry propagation adder is selectively coupled to the second result output of the first array and the third result output of the second array.

Similar features are recited in independent claims 55 and 69.

As acknowledged by the Examiner in the Office Action, Choquette fails to disclose or even suggest the claimed feature of “a second array that is used to perform binary polynomial multiplication.” In order to overcome this deficiency of Choquette, the Examiner alleges in the Office Action that Tong teaches a second array that is used to perform binary polynomial multiplication and that it would have been obvious to combined Tong and Choquette and produce the claimed invention. Applicants respectfully disagree.

Tong discloses a Galois field (GF) multiplier that uses programmable read only memories (PROMs) storing data in lookup tables, wherein the number of PROMs used, for example, is a function of the particular multiplication to be performed. FIG. 1 of Tong shows a GF(16) multiplier that uses two PROMs. FIG. 2 of Tong shows a GF(512) multiplier that uses three PROMs. According to Tong, this results in a “very dramatic reduction in hardware complexity.” (See, e.g., col. 4, ln 28 of Tong.)

A particular number of PROMs storing data in lookup tables is not “a second array that is used to perform binary polynomial multiplication” as described and claimed in the present application. Furthermore, the GF multipliers disclosed in Tong teach away from combining and/or integrating them with “a first array that is used to perform arithmetic multiplication . . . wherein the first input of the carry propagation adder is coupled to the first result output of the first array, and the second input of the carry propagation adder is selectively coupled to the second result output of the first array and the third result output of the second array.” Thus, Tong does not overcome the deficiencies of Choquette. As such, claims 43, 55, and 69 are patentable over Choquette and Tong, alone or in combination.

The deficiencies of Choquette are also not overcome by Bhandal or Bair. Thus, claims 43, 55, and 69 are patentable over Choquette, Tong, Bhandal and Bair, alone or in combination. Claims 44-54, 56-68, and 70-81 depend from one of claims 43, 55, and 69, either directly or indirectly, and are patentable over Choquette, Tong, Bhandal and Bair, alone or in combination, for at least the same reasons as claims 43, 55, and 69, and further for the specific features recited in claims 44-54, 56-68, and 70-81.

Reconsideration and withdrawal of this rejection of claims 43-81 are respectfully requested.

Conclusion

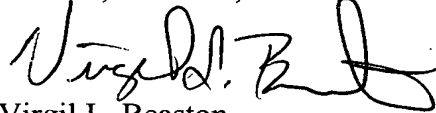
All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the

outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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Amendments to the Drawings

Attached hereto are nine sheets of formal replacement drawings containing FIGs. 1-9. FIG. 3 has been amended to add reference number 3080 (see page 10, line 2 of the specification as originally filed). This change does not introduce new matter.

Identification of the replacement drawing sheets submitted herewith is provided in accordance with 37 C.F.R. §§ 1.84(c) and 1.121(d). Acknowledgement of the receipt, approval, and entry of the replacement drawing sheets into this application is respectfully requested.